



ARGONNE HELPS RESHAPE THE FUTURE OF THE ELECTRIC GRID

In order for an electrical grid to reliably operate on renewable resources, such as wind or solar electricity, there has to be a backup plan for when the wind doesn't blow or the sun doesn't shine

THE CHALLENGE

Lithium-ion batteries, can discharge at full power for four to six hours. This is usually enough energy to guard against same-day variations due to passing clouds or fluctuating winds, or to extend solar electricity a few hours past sunset.

However, today's batteries cannot yet serve as an energy grid's sole source of power if windless or cloudy weather settles in. When that happens, cities and other municipal power grids turn to natural gas peaker plants, which generate greenhouse gases.

THE INNOVATION

Scientists in the Joint Center for Energy Storage Research (JCESR), a U.S. Department of Energy (DOE) Energy Innovation Hub led by DOE's Argonne National Laboratory, study

new battery chemistries that address long-duration storage and other energy problems. Through JCESR, they work to stretch the storage capability of batteries from hours to days. They also consider the role of cost, not just in battery design, but also in materials. Recently, they made a discovery that spun off a new company, Form Energy.

The JCESR research on multi-day storage showed the need to identify abundant new materials in order to develop an entire battery that costs less than a lithium-ion battery's electrodes. Researchers designed a flow battery that used water-based electrolytes operating at room temperature, dissolving sulfur for one electrode, and oxygen from the air as the other.

THE IMPACT

Worldwide, grid energy storage could be a 100-terawatt-hour proposition or more to keep the country's power grid humming uninterrupted as it taps renewable resources. Form Energy is designing new battery technology with inexpensive, earth-abundant domestic supply chains and rapidly scalable manufacturing in mind.

CONTACT

Argonne National Laboratory
9700 South Cass Avenue
Lemont, Illinois 60439
Phone: 630-252-2000
Email: partners@anl.gov
www.anl.gov

